Appendix F

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*Delmarva fox squirrel on the refuge*

# Wilderness Review

# WILDERNESS REVIEW AND EVALUATION FOR PRIME HOOK NATIONAL WILDLIFE REFUGE

## Introduction

A wilderness review is the inventory, study, and decision making process we use to determine whether to recommend Refuge System lands and waters for wilderness designation. The purpose of a wilderness review is to identify and recommend to Congress lands and waters of the National Wildlife Refuge System (NWRS) that merit inclusion in the National Wilderness Preservation System (NWPS). Wilderness reviews are a required element of comprehensive conservation plans (CCP), and we follow the planning process outlined in 602 FW 1 and 3. This process includes interagency, state and public involvement and NEPA compliance. Natural and Cultural Resources Management Part 610 Wilderness Stewardship chapter 4 Wilderness Review and Evaluation is followed for conducting wilderness reviews.

The wilderness review process consists of three phases:

**(1) Inventory:** where we identify lands and waters that meet the minimum criteria for wilderness. These areas are called Wilderness Study Areas (WSAs).

**(2) Study:** where we evaluate WSAs to determine if they are suitable for wilderness designation.

**(3) Recommendation:** where we use the findings of the study to determine if we will recommend the area for designation as wilderness in the final CCP. We report our wilderness recommendations from the Director through the Secretary of the Interior and the President to Congress in a wilderness study report.

**Phase I – Inventory:** During the inventory phase, we assess wilderness inventory areas (WIAs) under the minimum criteria for wilderness. The Wilderness Inventory Areas are First Hill, Second Hill, and Negro Island. Refuge lands and waters that meet those criteria are called wilderness study areas (WSAs). During the study phase we evaluate a range of management alternatives to determine whether a WSA is suitable for wilderness designation or for management under an alternate set of goals and objectives that do not involve wilderness designation. If we identify a WSA, we study it further in accordance with CCP process to determine its suitability for wilderness designation. We inventory Refuge System lands and waters to identify areas that meet the definition of wilderness in section 2(c) of the Wilderness Act. The criteria we used to evaluate areas and identify WSAs are:

**(1)** Size
**(2)** Naturalness
**(3)** Opportunities for solitude or primitive recreation
**(4)** Supplemental values

(1) **Size:** Section 3(c) of the Wilderness Act directed the Secretary to review every roadless area of 5,000 contiguous acres or more and every roadless island. The size criteria will also be satisfied for areas under Service jurisdiction in the following situations (610 FW 4.8):

(A) – An area with more than 5,000 contiguous acres (2,000 hectares). State and private land inholdings are not included in making this acreage.

(B) – A roadless island of any size. A roadless island is a roadless area that is surrounded by permanent waters or that is markedly distinguished from surrounding lands by topographical or ecological features such a precipices, canyons, thickets, or swamps.

(C) – An Area of less than 5,000 contiguous acres that is of sufficient size to make its preservation and use in an unimpaired condition practicable and is of a size suitable for wilderness management.

(2) **Naturalness:** we evaluated the naturalness criteria to identify a WSA during the inventory phase of the Wilderness Review as per Service policy 610 FW 4.9 which is premised on Section 2(c) wilderness area definition that "…generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable." To make this determination, it must be possible to observe the area as being generally natural, rather than "pristine."

**Naturalness Evaluation Criteria.** Current policy (610 FW 4.9) provides the following guidance for naturalness evaluation:

(A) –"We make a distinction between an area's **"apparent naturalness"** and **"historic conditions"** in the context of biological integrity, diversity, and environmental health. The term "historic condition" refers to the condition of the landscape in a particular area before the onset of significant human-caused change. The term "apparent naturalness" refers to whether or not an area looks natural to the average visitor who is not familiar with historic conditions versus human-affected ecosystems in a given area. We have addressed the question of the presence or absence of apparent naturalness (i.e., are the works of humans substantially unnoticeable to the average visitor?)" when considering areas to be included in the inventory phase of our wilderness review.

(B) –"We avoided an approach of assessing naturalness that limits designation only to those areas judged to be pristine. Land that was once logged, used for agriculture, or otherwise significantly altered by humans is eligible for wilderness designation if it has been restored or is in the process of being restored to a substantially natural appearance".

(C) **-** "We use caution in assessing the effects on naturalness that relatively minor human impacts create. An area being evaluated may include some human impacts provided they are substantially unnoticeable in the unit as a whole. Examples of manmade features that would not disqualify an area for consideration as a WSA include: trails, trail signs, bridges, fire towers, fire breaks, fire presuppression facilities, pit toilets, fisheries enhancement facilities (such as fish traps and stream barriers), fire rings, hitching posts, snow gauges, water quantity and quality measuring devices, research monitoring markers and devices, wildlife enhancement facilities, radio repeater sites, air quality monitoring devices, fencing, spring developments, and small reservoirs. Even with these features, an area may express wilderness character and values."

(D) **-"**We may disqualify portions of an area from consideration where significant human-caused hazards make that area unsafe for public use, such as contaminated sites or the existence of unexploded ordnance from military activity. Once these conditions are corrected, we may then consider that portion of the area."

(E) -Additional policy guidance suggests that "we do not disqualify areas from further wilderness study solely on the basis of the 'sights and sounds' of civilization located outside the areas. Where human impacts are outside the area being inventoried, we do not normally consider them in assessing naturalness. However, if an outside impact of major significance exists, we should note it and evaluate it in the inventory conclusions. Human impacts outside the area should not automatically lead us to conclude that an area lacks wilderness characteristics".

(F) -Policy guidance also stipulates that "we do not disqualify areas from further wilderness study solely on the basis of established refuge management activities or refuge uses that require the use of temporary roads, motor vehicles, motorized equipment, motorboats, mechanical transport, landing of aircraft, structures, and installations generally prohibited in designated wilderness. The physical impacts of these practices should be the focus of the naturalness evaluation. We evaluate existing and proposed refuge management activities and uses in the study phase of the wilderness review."

(3) **Opportunities for Solitude or Primitive Recreation:** "Section 2(c) of the Wilderness Act defines wilderness as an area that has outstanding opportunities for solitude or a primitive and unconfined type of recreation. An area does not need to have outstanding opportunities for both elements and does not need to have outstanding opportunities on every acre". (610 FW 4.10) Solitude is defined as "wilderness solitude is a state of mind, a mental freedom that emerges from settings where visitors experience nature essentially free of the reminders of society, its inventions, and conventions. Privacy and isolation are important components, but solitude also is enhanced by the absence of distractions, such as large groups, mechanization, unnatural noise and light, unnecessary managerial presence (such as signs), and other modern artifacts". Primitive recreation is defined as "activities that provide dispersed, undeveloped recreation and do not generally require permanent facilities."

The service evaluates outstanding opportunities for solitude or a primitive and unconfined type of recreation based on the following 610 FW 4.10:

(A) – "The Wilderness Act does not define what was intended by "solitude or a primitive and unconfined type of recreation." In most cases, we could expect the two opportunities to go hand-in-hand. However, an outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreational use that it would be difficult to maintain opportunities for solitude (e.g., around water)".

(B) – "We assess each inventory area on its own merits to determine if an outstanding opportunity exists; we must not compare areas. We may not use any type of rating system or scale, whether numerical, alphabetical, or qualitative (i.e., high-medium-low), in making the assessment".

(C) – "When an area is contiguous to designated wilderness, proposed wilderness, recommended wilderness, a WSA, or other Federal lands that a land management agency has already determined to have wilderness character (i.e., Service, BLM, Park Service, or Forest Service lands), an additional evaluation of outstanding opportunities is not required".

(D) – "An area does not have to be open to public entry and use. Congress has designated several Service wilderness areas that are closed to public use to conserve wildlife and fragile habitats".

(4) **Supplemental Values:** The Wilderness Act states that an area of wilderness may contain ecological, geological, or other features of scientific, cultural, symbolic, or educational value. Supplemental values of the area are optional, but the degree to which their presence enhances the area's suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features. Wilderness Values "are biophysical (e.g., ecosystems, scenery, and natural processes), psychological (e.g., opportunity for solitude or primitive recreation), symbolic (e.g., national and natural remnants of American cultural and evolutionary heritage), spiritual (e.g., sense of connection with nature and values beyond one's self)".

## SUMMARY OF PHASE I WILDERNESS INVENTORY FINDINGS

As part of the CCP planning process we have conducted a wilderness review and Phase I Inventory to evaluate new information and implement new policy of Wilderness Stewardship Guidelines for national wildlife refuges (610 FW 4) issued on November 2008, for a discrete part of the Refuge (cluster of roadless islands located in Management Unit II) that has been identified as having wilderness potential.

The vast majority of the 10,144 acres of Prime Hook NWR was eliminated from consideration because they do not meet the roadless, naturalness, or solitude criteria, based on one or more of the following factors. The imprint of human work is obvious and prominent throughout those areas, which are divided by refuge and state roads, agricultural fields, impoundments, buildings, parking lots, utility right-of-ways, ditches, trails, and levees. This includes existing areas of forest, agriculture lands, impounded wetlands, and salt marshes within Units I , II, III, and IV.

Ongoing refuge management activities include plantings, mowing and managing impoundments. Numerous roads, ditches and levees are present in the forested wetlands. The 10,144 acres also contain developed areas for maintenance, visitor services, and administration, with all their associated parking areas, tour roads, and office and storage facilities. Traffic along state roads is constantly visible or with in hearing of any location within this area. Boat traffic is evident within some of the area as well.

During the preplanning phase of the Refuge's CCP process, the Service contracted the State's Natural Heritage Program to inventory rare plant and animal species and communities and map out Prime Hook's NVCS cover-types. Based on the discovery of several "Legacy Trees" located on inventoried roadless islands in Unit II, these areas may have wilderness potential when considering the context of State's current forested landscape conditions. These areas not only serve as a repository of exceptional large trees but also contain significant ecological, cultural, and scientific value as remnants of eastern North American natural and evolutionary heritage left standing in the State of Delaware.

**Ecological Significance of Legacy Trees Today:** Prior to pre-European settlement, old growth stands dominated the forested landscape (70-90%) throughout the northeast and east coast providing critical elements of biodiversity and habitat characteristics for many wildlife species that are uncommon and/or endangered today in the State of Delaware. However, old-growth and late successional forests are extremely rare in Delaware as most fragmented forest parcels are secondary growth forest. The only example of old-growth or late-successional remnants remaining, are large, old trees sometimes referred to as "Legacy Trees."

Legacy trees are large (25-30" dbh), old (150+ years) trees that have been spared during previous harvest or have survived stand-replacing natural disturbances (e.g., windstorms, ice and snow storms, insect outbreaks, and disease). Old, large trees are rare today but they were historically a dominant age class in forests of the past. As measured by species richness, diversity, and use by a number of different wildlife taxa, several studies have shown that the retention/conservation of individual legacy trees can have added significant habitat and wilderness values associated with long term biodiversity and managing biological legacies (Mazurek & Zielinski -2004; Hunter & Bond 2001; Bull et al 1997).

*Summary of Key Benefits of Individual Legacy trees*

- high correlation between legacy tree retention and species richness and diversity, especially for birds;
- adds diversity of tree diameters that provide habitat and cover for a wider range of species compared to younger trees or even-aged stands;
- unique crown architecture & bark morphology provide plentiful micro-niches for lichens, mosses, insects, and nesting perches for migratory birds;
- provide tree elements with basal hollows that support birds, bats, and other mammal species making it possible for many wildlife species to breed where they would not otherwise be able to;
- can serve as "old-growth ambassadors" for public appreciation, experience, and education of ecological significance and beauty of legacy trees and a sense of connection with more ancient symbols of nature;

- given scarcity of old-growth or late-successional tree examples and highly fragmented nature of secondary growth in the state, individual legacy trees may function as "mini-reserves" to promote ecosystem function and conservation;
- retain a primeval character and influence on the land serving as historical and natural benchmarks for ecological studies.

**Historic and Cultural Significance of Refuge Roadless Islands within Unit II:** As part of the CCP pre-planning process, a study and summary of known Refuge historic and prehistoric sites plus an evaluation of archaeological sensitivity in and around Refuge lands was conducted to identify landforms and areas likely to contain undiscovered archaeological resources. Of the wilderness review areas First Hill (PMH-033P)/7S-C-78 has been designated as a prehistoric site.

Prior to allowing Open Marsh and Water Management (OMWM) excavations to occur on the Refuge and as part of the EA for proposed OMWM work, Wise (1988) using prehistoric settlement patterns and wetland sites identified by Custer and Galasso (1983) and Custer (1986) developed a graphic model for paleography and prehistoric site sensitivity at PHNWR. Later, archeologists in 2004 (Tetra-Tech-FW, Inc.) enhanced capabilities of prior explanatory models since the known sites on Refuge were limited (16 prehistoric & 31 historic). Additional known sites within a one mile radius of the Refuge were included to expand model data set to include 25 prehistoric and 53 historic sites. This expanded focus included more wetland sites based on the archaeological monitoring prior to OMWM excavations at PHNWR had led to the identification of several archaeological sites in wetland areas (Clark & Blume, 1990 & 1993).

**Qualification of Wilderness Inventory Areas as Wilderness Study Areas (WSAs):**
*First Hill, Second Hill, and Negro Islands*

**Conditions Common to all Three Islands**

**Size Criteria:** First Hill (3 acres), Second Hill (5 acres), and Negro Island (2 acres) all meet the size criteria, as the Wilderness Act does not specify a minimum size for roadless islands. The size criteria for areas under Service jurisdiction state that a roadless island can be any size, as long a it fits the definition in 610 FW 1.5 AA:

> *A roadless island is defined as "a roadless area that is surrounded by permanent waters or that is markedly distinguished from surrounding lands by topographical or ecological features such as precipices, canyons, thickets, or swamps."*

**Naturalness Criteria:** All three roadless islands do not meet the naturalness criteria where the term "apparent naturalness" is defined as whether or not an area looks natural to the average visitor who is not familiar with the historic condition versus human-affected ecosystems in a given area. The three islands do not meet the naturalness criteria because they are within and altered and managed impoundment. However, there are existing elements of biological integrity, diversity, and environmental health. All three roadless islands are part of the Mesic Coastal Plain Oak Forest community found on the Refuge. These islands are located within isolated wetlands. The islands are dominated by a mixture of loblolly pine, pond pine, and one or more oak species. Understory strata is characterized by American holly, highbush blueberry, swamp doghobble, sweet pepperbush, swamp azalea, and green briar. The herbaceous layer is sparse with rice-cut grass, stout wood reedgrass, slender spikegrass, partridge betty, royal fern and wintergreen. These features enhance the "naturalness" of the areas. However, a road was once used to access these islands. The remnants of this road are still visible today and can also be seen in aerial photographs taken in the 1930's. The aerial photographs taken in the

1930's also show that there was also an agricultural field on Second Hill. It should also be noted that the surrounding wetlands are artificial. As noted in the vegetation survey, Japanese stilt grass and Phragmites are common invasive species to these island habitats.

The unit in which these islands reside is influenced by the artificial water management capabilities developed by the Service**.** This management unit is bounded on the north by Fowler's Beach Road, barrier dunes on the east facing the Delaware Bay, Prime Hook Road on the south, an upland interface on the west, and a sand dike plus Prime Hook beach community on the east. During storm tides this sand dune system has been breached several times and washouts have deposited sand and salt water into the Unit II impoundment.

Delaware Bay's normal tidal ranges are from 3 to 3.5 feet except for storm surges and spring tides (+ 6.5 ft). Tidal flow enters Slaughter Canal from the Delaware Bay through Unit I salt marshes into the northern portion of Unit II and fresh water flow enters Unit II on the west from Slaughter creek. Since 2009, salt water enters Unit II via the breaches south of Fowler's Beach Road.

**General description and background history of Unit II impoundment**

Until 1900, Unit II marshes remained unchanged, consisting of a brackish system dominated with cattails and sedges. Prior to the refuge acquiring Unit II, both private land owners and the state mosquito control agency used timber sheeting to construct small water control structures throughout Unit II to manage water levels. Portions of Unit II were also heavily grid ditched during the 1930's for mosquito control. To maintain water on the marsh during the fall and winter for muskrat trapping and waterfowl hunting, private owners built water control structures at Fowler's Beach Road, Oak Island and near the bridge at Slaughter Creek to hold water.

Landowners had the marsh drained and dug Slaughter Canal in the early 1900s to improve drainage of their upland areas by channelizing water north to Cedar Creek. In 1906 the Slaughter Canal dredging reached into Unit II and ended at Oak Island. The construction of Slaughter Canal vastly increased drainage in Unit II marshes and lowered water tables in upland areas and significantly altered tidal exchange, leaving only a narrow band of tidal marsh along the edge of the canal and around Oak Island. The dredging of the canal also contributed to *Phragmites* colonization so that by the 1980s, Unit II had completely reverted to a *Phragmites* jungle, with dense stands covering 1,000 acres (See Prime Hook's Environmental Assessment for Chemical Control of *Phragmites* and Proposed Marsh Rehabilitation-March 21, 1983).

In 1934, a dike was dug by dragline, along the eastern edge of the marsh from Slaughter Beach to Prime Hook Beach to prevent the bay from washing into the marshes. The deep borrow ditch is still evident today but several sections have been filled by washouts. Until the early 1950s, access to Prime Hook Beach was possible only by boat or during the dry summer by horse or vehicle. In 1953, a gravel roadway was constructed across the marsh and today this roadway is paved (Prime Hook Beach Road). It has effectively acted as a dike between Units II and III with culverts under the roadway resulting in some limited flow of water between the units. All of these anthropocentric activities have significantly altered the hydrology of Unit II wetlands (USFWS 1986).

From the establishment of the refuge in 1963 to 1986, Unit II had no water level management capabilities. In 1963, the Service proposed a water management plan which outlined marsh management needs for the entire refuge including Unit II to the public. The plan was designed to

impound refuge marshes without backing water against upland areas. Local residents expressed strong opposition to the proposal and the state Drainage Engineer felt that it had the potential to flood or waterlog contiguous agricultural lands as occurred at Bombay Hook NWR. A revised plan with inland canals to provide drainage of uplands was also strongly opposed. Subsequently, a "No Management" policy was adopted which resulted in a severe decline in the quality, quantity, and productivity of the Unit II marshes over the ensuing years (USFWS 1986). Then in 1987 a large concrete water control structure was put into place. Impounding 1,500 acres this water control structure located on the northern boundary at Fowler Beach Road held back salt water from intrusion into Unit II. After water level management capability was established, salinities within this impoundment range from 0 to 8 ppt year round.

Slaughter Creek was the most significant watercourse in the unit, flowing southeasterly across the entire Unit II to Prime Hook Creek south to Prime Hook Road. Today, the hydrology of Unit II was first changed with the installment of water control infrastructure as water flows northward to Unit I from First and Second Hills to Fowler Beach Road but from Oak Island south, water flows in a southerly direction to Prime Hook Road. With the breaches the salinities can vary from 10 to 30 ppt.

Unit II restoration of water level management in 1987 significantly enhanced the water table of these marshes. Water sources that affect the hydrology of this unit today come from tidal action, runoff from Slaughter Creek, excess water from the Unit III, rainfall and local runoff. Tidal waters have dramatically affected the salinities and extent of open water in Unit II since the breaches occurred.

**Opportunities for Solitude or Primitive Recreation:** The WIAs identified in the Refuge's Inventory Phase are discrete roadless islands identified by State Heritage scientists as having wilderness potential based on unique ecological, scientific and historic value. However, the small acreage of the islands does not lend themselves to primitive recreation.

**Supplemental Wilderness Values:** All three roadless islands possess several supplemental values which include ecological and geological features, archaeological significance, symbolic wilderness value in the form of legacy trees, and unique opportunities for public environmental education and appreciation of exemplary large trees. Examples of unique ecological and geological features on the islands include poorly drained sand makes up the substrate for the community and it also has a very high water table. They also support several examples of "Legacy Trees" unique to the State that include pin oak, willow oak, black walnut, water oak and pond pine tree species. Due to the natural seclusion of these areas, eagle nests have been established on the First and Second Hills, all on exceptionally large loblolly pines. Fist Hill is an example of an archeological significant area as it is a designated state and federal prehistoric site. Also the scientific, educational and recreational values of the islands could include with special planning, seasonal trips to the islands could provide unique opportunities for the public to enjoy legacy trees, understand their ecological, historic, and provide for scientific research of late successional remnant trees and adjacent habitats.

**Land Status and Service Jurisdiction:** The Service has full jurisdiction over the lands and waters of these three roadless islands and surrounding wetlands that would ensure maintenance of wilderness resources and character within these potential wilderness study areas and there are no non-federal lands within the WSAs.

**Conclusion**

The vast majority of the 10,144 acres of Prime Hook NWR was eliminated from consideration to be wilderness because they do not meet the roadless, naturalness, solitude or primitive recreation criteria and the imprint of human work is obvious.

The Service also finds that none of the WIAs in Prime Hook NWR meet the minimum criteria to qualify as a WSA as defined by the Wilderness Act. First Hill, Second Hill, and Negro Island all meet the size criteria, as the Wilderness Act does not specify a minimum size for roadless islands. But, the three islands do not meet the naturalness criteria because they are not primarily affected by nature and the imprint of mans' work is substantially noticeable. The islands reside in a unit influenced by artificial water management developed by the Service. The management of the Unit II impoundment, past and current has had a tremendous impact on the hydrology of the area. These impacts include invasive species intrusion, fluctuating water tables, reduced salinity for several decades and now inundation of former marsh, altered hydrology, and mosquito control to include grid ditching. This area has been heavily manipulated by humans for over a century, and its historic natural appearance (as confirmed by core studies) would have been as an extensive salt marsh system. The islands also do not qualify for opportunities for primitive recreation because of the small acreage of the islands. The last criteria of supplemental values are not required for wilderness, but do exist on the Islands. All three islands possess supplemental values which include ecological and geological features, archaeological significance, symbolic wilderness value and opportunities for environmental education.

None of the Wilderness Inventory Areas meet the minimum criteria to qualify as a Wilderness Study Area so Prime Hook NWR is not considered further for possible designation in its CCP.